Improving land-use for integrated climate actions: An approach taken at the local level in the Philippines

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Background

- **Synergies** identified among various policies and measures for climate change adaptation and mitigation
- However, *little common understanding* established on how to integrate the policies effectively
- **A pilot project** (funded by Ministry of the Environment, Japan) initiated to develop a method to integrate climate policies, focusing on land-use planning
- Targeting a river basin, the project **support local government to improve its land-use** with climate consideration
Pilot project: Target area

Silang-Santa Rosa River Basin, The Philippines
Area shaded in red (above), topography (right)
Joint research with University of the Philippines at Los Banos
Target area (2)

- 40km south of Manila
- Total basin area: 120km²
- Adjacent to Lake Laguna, the largest lake in Philippines
- Municipalities:
  - Laguna: Santa Rosa, Cabuyao, Binan
  - Cavite: Silang
- Total population: 570,000
Target area (3)

• Environmental problems (Tongson, 2012):
  – Population growth, land-use change, climate change affect water resources in the river basin
  – As a result, water supply, public health, food security affected
  – Natural disasters such as floods and land slides intensified

• Municipalities revising Comprehensive Land-Use Plan (CLUP) with climate consideration

• University of the Philippines Los Banos (UPLB) study on integrated watershed management in communication with municipalities
Methodology

- Scenario development
- Risk assessment
- Climate change measure development
- Climate-sensitive land-use planning
Future scenarios

Industrialization, urbanization
• Population growth, change in population distribution
• Change in land-use, land cover
• More infrastructure, buildings

Climate change
• Increase in hourly precipitation, rainfall duration, etc.

Increase in areas affected by disasters (e.g., floods) and in damage to human and economy in the areas

Baseline scenarios (w/o measures)

Development plan, land-use plan, etc.

Change in land-use, land cover
• Forest, farmland > housing, industries

Change in population distribution
• Population decrease in high-risk & upriver areas

Decrease of infrastructure & buildings in high-risk & upriver areas

Decrease in affected areas and human and economic damage

Action scenario (with measures)
Risk assessment

Create hazard map

Calculate risk to people and properties (economy)

Calculate the change in storm water runoff over the past decade leading to more flooding due to development (land-use change)
Risk mapping

Population in flooded area: Over 100,000

Land use in flooded area

(Source: B. Johnson, IGES)
Possible climate change measures

**Improved land-use**
- Development control in high-risk areas – Climate change adaptation (CCA)
- Urban greening – CCA&M

**Flood-tolerant, environment-conscious building**
- Strengthened building codes in high-risk areas (e.g., embankment, high-floored housing) – CCA
- Roof greening, green building – Climate change mitigation (CCM)

**Ecosystem-based, integrated watershed management**
- Maintenance and improvement of watershed protection function (flood alleviation, water retention ability) of ecosystem
  - Development control in upriver areas – CCA
  - Afforestation & reforestation – CCA&M
  - Watercourse management (e.g., riverbank reinforcement, dredging, river cleaning) – CCA
- Change in varieties and cultivation methods of agricultural products – CCA
Land-use in flooded areas according to future scenarios

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Baseline scenario</th>
<th>Action scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooded area</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Agricultural land and green space</td>
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<td>↑</td>
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<tr>
<td>Residential and industrial areas</td>
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<tr>
<td>Affected people &amp; economic loss</td>
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Inter-city cooperation

• A mechanism for cooperation between upriver and downriver local governments sought with the following possible arrangements:
  – Designation of contact persons
  – Regular communication
  – Memorandum of agreement
  – Establishment of management council
  – Economic instruments (e.g., payment for ecosystem services)
Conclusion/key messages

• **Improving land-use planning** can be one of successful approaches for effectively integrating climate change adaptation and mitigation measures.

• Land-use approach is a **systematic process with multiple steps**: 1) Scenario development, 2) Risk assessment, 3) Climate change measure development, and 4) Climate-sensitive land-use planning.

• **Targeting/managing river basin as a whole** with inter-city cooperation helps address climate-related disasters (e.g., floods) downstream.

• **Ecosystem-based, integrated watershed management** can provide technically- and economically-feasible solutions and co-benefits to address conservation and climate disasters at the same time.